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| 08/870,836 | 06/06/97 | HAMPAPUR | VIRAGE.007A |

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EXAMINER
RAD, A

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| ART UNIT 2/13 | PAPER NUMBER |
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DATE MAILED: 10/13/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
08/870,386

Applicant(s)
Hamapapur et al.

Examiner
Anand Rao

Group Art Unit
2713



☒ Responsive to communication(s) filed on Aug 4, 1999

☒ This action is **FINAL**. *JP*

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-22 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-22 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Response to Amendment

1. Applicant's arguments filed on 8/4/99 in Paper 6 with respect to claims 1-22 have been fully considered but they are not persuasive.
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhang et al., (hereinafter referred to as "Zhang"), as was set forth in the Office Action of 4/28/99 mailed as Paper 5.

The Applicant presents six substantive arguments contending the Examiner's rejection of claims 1-22 under 35 U.S.C. 102(e) as being anticipated by Zhang et al., (hereinafter referred to as "Zhang"), as was set forth in the Office Action of 4/28/99 mailed as Paper 5. However, after a careful consideration of the arguments presented and further scrutiny of the Zhang reference, the Examiner must respectfully disagree for the reasons that follow below.

Firstly, the Applicant argues that Zhang's three algorithms used for image analysis are not all directed towards key frame selection, but for the segmentation processes and shot breaks detections (Paper 6: page 4, lines 8-33; page 5, lines 1-12; page 7, lines 4-13). The Examiner

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respectfully disagrees. In particular, the algorithms for selecting segmentation boundaries according to their established thresholds as discussed in the rejection (Zhang: column 4, lines 62-68; column 5, lines 1-68; column 6, lines 1-63) are part of the initialization steps (Zhang: column 5, lines 15-30) in executing the video segmentation and shot break detection (Zhang: column 6, lines 35-63). It is noted that the key frame selection process also discusses an initialization step of the system parameters (Zhang: column 7, lines 30-40; figure 4, element 502). The Examiner asserts that this initialization step is established in terms of the three previously discussed algorithms for the purpose of key frame selection, and accordingly, are not entirely different processes but a modification of system parameters for three different desired results. It is further important to note that Zhang touts the “flexible” nature (Zhang: column 4, lines 20-26) of the multi-pass use of algorithm (Zhang: column 6, lines 30-35). Accordingly, the Examiner maintains that the Zhang staggered use of algorithms are directly implemented for the key frame selection process, as well.

Secondly, the Applicant argues that Zhang fails to disclose the use of “structural difference measures” based on an incorrect assumption of Zhang’s discussion of the art (Paper 6: page 5, lines 23-34; page 6, lines 1-4). The Examiner respectfully disagrees. The pertinent section of the reference (Zhang: column 7, lines 52-61). What that section states is that known prior art methods of determination of temporal variations or “structural difference measurements” heavily depending upon the tracing of the positions and sizes of the objects for key frame extraction, but this prior art method is not desired as it is being impractical because it relies upon accurate motion field

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detection, and complicated image warping (Zhang: column 7, lines 54-59). However, Zhang clearly says that the current method of the patent doesn't use this prior art method, using content based temporal variation determinations based on the metrics as discussed above and executed in conjunction with the depicted processes of figures 4 & 4A (Zhang: column 7, lines 59-62). Lastly, while the metric based on histogram comparison does ignore spatial changes as the applicant has duly noted (Zhang: column 4, lines 1-5), the likelihood ratio is very robust in terms preserving "content" behavior in a frame especially being tied optimally to the segmentation process (Zhang: column 3, lines 60-68). In particular, the pixel histogram metrics (Zhang: column 4, lines 1-25) for each of the color components of the TV/video signal (Zhang: column 4, lines 55-60) would read upon the chromatic difference measurements, while the likelihood ratio difference metric would be used for the structural difference metric which would more suitable for tracking content variations on a frame specific region basis (Zhang: column 3, lines 49-53), and this is combination that would read upon the instant invention.

Thirdly, while discussing the nature of the two claimed measurements, the Applicant goes on to discuss the "orthogonal" nature of two claimed difference measurements (Paper 6: page 6, lines 6-22) as a means for adding weight the limitations of pertaining to these measurements. However, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "orthogonal nature") are not recited in the rejected claim(s) 1-9, and 11-22. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the

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claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Now, going to the “orthogonal nature” of claim 10, which the Applicant has accurately noted as an inadvertent oversight on the part of the prior Office Action (Paper 6: page 7, lines 14-19), the Examiner asserts that Zhang’s disclosure also describes the “orthogonal nature” of the two measurements as they have been described above would appear to have been summarily met, since the Examiner has already asserted that the region dependent likelihood ratio metric would address the “structural properties” of the frames, while the color component histograms would address brightness, or distribution of color over the frames, and equal the presented definition the “orthogonal nature” of the first and second measurements.

Fourthly, the Applicant argues that the chromatic difference measure and structure difference measure are user selectable, whereas the Examiner’s application of the Zhang’s difference metrics above would not have the thresholds as being user selectable (Paper 6: page 6, lines 23-38; page 7, lines 1-3). The Examiner respectfully disagrees. In particular, while an initial selection of parameter’s thresholds might be characterized as “automatic” based on statistics of the video frame as is noted by the Applicant (Paper 6: page 6, line 26), the continued use of those parameters are “tunable” (Zhang: column 7, lines 20-30) and this is further claimed to selectable (Zhang: column 12, lines 45-65), which clearly reads on the claims.

Furthermore, the Applicant argues that Zhang fails to meet the limitation that the second difference measure is more computationally intensive than the first difference measure and that they are executed in a hierarchical manner (Paper 6: page 7, lines 20-31). The Examiner

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respectfully disagrees. Merely from a pictorial representation of the key frame selection process, one can see that the execution of step of 506 and then of step 510 (Zhang: figure 4, elements 506, 510) occur in a hierarchial fashion. Both of these steps are difference metric dependent and proceed towards the determination of the key frame (Zhang: figure 4A, element 512).

Furthermore, it is noted that in making these determinations using a multi-pass process, the first difference metric execution is run at a lower resolution for faster processing than the second difference metric as it pertains to the process of figures 3A1-3A3 (Zhang: column 6, lines 20-35), and this strategy carries over to the process of key frame selection as depicted in figures 4-4B. In particular, the use of "looser" thresholds at lower levels or processing steps (Zhang: column 6, lines 47-56), will result in those steps being less computationally intensive than the high level steps (Zhang: column 7, lines 1-10).

Lastly, with regards to using three difference metrics as specified (Paper 6: page 8, lines 1-7), the Examiner notes that this can also be met by the reference as well. Merely from a pictorial representation of the key frame selection process (Zhang: figure 5C, element 652), one can see the execution of third hierarchically implemented difference metrics. The third and closest to the key frame selection process in question is step 650 (Zhang: figure 5C, element 650), this portion connects to the lower levels of key frame selection at linking point I, and following the process through steps 632, and 626, one sees the calculation and use of a second difference metric at step 624 (Zhang: figure 5B, element 624). Proceeding that step 624 on figure 5B up to linking points D up through the flowchart of figure 5A up to linking point C on the initial level dependent upon

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figure 5, where one sees, the execution of the first difference metric at step 608 (Zhang: figure 5, element 608). Accordingly, one can see that Zhang clearly discloses the use of three difference measurements.

For the reasons discussed above, the Examiner maintains the grounds of rejection.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand S. Rao whose telephone number is (703)-305-4813.

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RAO S. RAO
PATENT EXAMINER

asr

October 8, 1999